VAA-Weekly-Progress

02/11-02/18

Context

- Used three different methods for species similarity and extracted list of most similar species
- Created a visible keypoint definition

Goal

- Do training of species similarity with top 10 species
  - Train RTMPose with Limb Ratios dataset - Zian
  - Train RTMPose with Centroid Variation dataset - Parth
  - Train RTMPose with Dino Feature Extraction dataset - Josh
- Train RTMPose with closest images to antelopes (regardless of species) - Shaan
- Train Previous Dataset Model with 5 seeds to find variation (full AP10k; 3, 7, 21, 42, 65536) - Medha, Claire
- Finish Biological Keypoint definitions - Medha, Claire
- Start labeling AP10k with visible keypoint definition

Biological Keypoints

- Created a biological keypoint definition based off a reference image of an antelope skeleton
- Expected to be very difficult for labelers - but may introduce variation to the keypoints, which may help with generalization
- In Box

Centroid Variation Based Training

- Previously found top 10 animals similar to antelopes based on centroid variation
  - Used these to train and validate the model (1708 total images, 1367 train, 341 val; 80:20, train:val split)
  - These numbers are slightly inflated compared to the standard we had last semester where it was 1169 test and 140 train (90:10, train:val split)
    - Will try to scale dataset down so that we can see impacts of this training set compared to our previous results (AP10-k reduced, bovidae+cervidae reduced and bovidae)
- Next slide contains results and comparison with Full AP10-k testing on antelopes

Centroid Variation Model Results

AP - Average Precision, AR - Average Recall on 100 antelope images

	Top 10 Centroid	Full AP-10k
coco/AP:	0.810	0.805
coco/AP .5:	0.979	0.968
coco/AP .75	0.871	0.865
coco/AP (M):	0.783	0.777
coco/AP (L):	0.808	0.806

	Top 10 Centroid	Full AP-10k
coco/AR:	0.830	0.825
coco/AR .5:	0.980	0.971
coco/AR .75	0.882	0.877
coco/AR (M):	0.817	0.800
coco/AR (L):	0.831	0.826

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RTMPose training base on limb ratio

- Last week we used limb ratio to get the Top ten most similar species to antelope.
- This week we used data from these ten species for training("argali sheep", "horse", "moose", "dog", "zebra", "deer", "sheep", "cow", "fox")
- Total images: 2622 train images: 2283 val images: 339 (9:1)

RTMPose result based on limb ratio

	Top 10 with limb ratio	Full Ap-10k
coco/AP	0.808	0.805
coco/AP .5	0.969	0.968
coco/AP .75	0.876	0.865
coco/AP (M)	0.725	0.777
coco/AP (L)	0.809	0.806
coco/AR	0.828	0.825
coco/AR .5	0.971	0.971
coco/AR .75	0.887	0.877
coco/AR (M)	0.750	0.800
coco/AR (L)	0.830	0.826

Next Steps

- Work on the abstract
- Start labeling AP10k with both labeling schemes (if approved)
- Determine the next steps with species similarity

Personal Progress

Medha

- Came up with keypoint definition for biological keypoints
- Trained RTMPose on AP10k with different seeds to help monitor the variation of the model

Parth

- Generated dataset based on top 10 centroid species
- Trained RTM pose on top 10 centroid species

Josh

- Working on adding SAM2 segmentation mask to isolate the foreground of the image(and eliminate effect of background), and grayscale image(to eliminate color scheme factors), before extracting features with DINOv2

Next Steps:

- Add pre-processing steps, to DINOv2 feature extraction, and generate a new ranking of similar species

- Train RTMPose on the top 10 similar species from original DINOv2 ranking and the new DINOv2 ranking

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